Dr. Vander Weide's recommendation of using the contemporaneous yield on short-term rates as an estimate of the expected yield on Treasury bills is unreasonable. This method will generally produce biased estimates. The cost of equity will be an underestimate in times of rising interest rates. It will produce an overestimate in times of falling interest rates.

The method employed by Brattle does not suffer from such biases and is well grounded in financial theory. It is generally accepted that long-term rates reflect, at least in part, investor's expectations about future short-term rates.[46] Therefore, the yield on longer-term Treasuries reflects the average expected yield on one-month Treasuries plus some premium. Therefore, it is reasonable to obtain an estimate of the expectation of one-month Treasury bills from yields on longer-term Treasuries by subtracting an estimate of the premium. That is exactly what Brattle does.

2. **Dr. Vander Weide's Recommendation to Use the Long-term Rate as an Estimate of the Risk-Free Rate is Inconsistent with the Underlying Financial Theory**

In addition to criticizing Brattle's choice of the proxy for the short-term rate, Dr. Vander Weide criticizes us for the choice of the short-term rate as the risk-free rate in the first place. At paragraph 17 of his affidavit, Dr. Vander Weide states that the yield on long-term Treasury bonds is a more appropriate estimate of the risk-free rate than the yield on short-term Treasury bills since equity is a long-term investment.

The theory underlying the CAPM is that the risk-free rate is the expected rate of return on an asset with zero risk. Dr. Vander Weide even agrees to this characterization at paragraph 8 of his affidavit. Brattle asserts that the best practical proxy for an asset with zero risk is one-month Treasury bills. Yields on long-term bonds are higher because they require additional return to compensate for their additional risk. The additional risk is in the form of the uncertainty about the underlying real rates, and uncertainty about the inflation rate.

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[46]   See Brealey and Myers, *op. cit.* at Chapter 23.

Brattle calls the compensation for the additional risk the "maturity premium." For these reasons, the yield on long-term Treasury bonds is not a riskless rate.[47]

III. DR. VANDER WEIDE'S COST OF CAPITAL ESTIMATE REVISITED

At the outset of the previous section we stated that the disparity between Dr. Vander Weide's estimate of 11.83 percent and Brattle's recommended cost of capital of 13.0 percent is largely driven by controversies over two factors: use of adjusted versus unadjusted betas and zero versus non-zero debt betas. In this section we show empirically how each of these affects the 11.83 percent cost of capital obtained by Dr. Vander Weide. In addition, because of the dramatic difference between the weighted-average embedded cost of debt and the actual average embedded cost of debt obtained from Dr. Vander Weide's data, we have also examined the sensitivity of the cost of debt in these calculations. We conclude that simply substituting reasonable estimates for the debt betas in Dr. Vander Weide's procedures, as compared to Dr. Vander Weide's unsupported assumption of zero debt betas, results in estimates of the overall cost of capital for the cable industry between 12.6 to 13.3 percent. These estimates just lend further support to a cost of capital for the cable industry of at least 13.0 percent.

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[47] CAPM cost of equity estimates based on Dr. Vander Weide's recommendations of a long-term Treasury rate as the risk-free rate and the corresponding market risk premium actually produces *higher* cost of equity estimates than the CAPM based on Brattle's short-term rate of 5.0 percent and the corresponding risk premium of 8.5 percent for all betas less than 1.75. Use of the long-term rate Dr. Vander Weide recommends produces results closer to Brattle's ECAPM models. This can be seen by looking at the following formulas. Dr. Vander Weide's risk free-rate recommendation produces a CAPM equation of the form

$$r_E = 7.27 + 7.2\beta$$

Brattle's ECAPM formula is

$$r_E = (5.0+2.0) + \beta(8.5-2.0) = 7.0 + 6.5\beta \quad .$$

In fact, Brattle's ECAPM formula produces cost of equity estimates that are lower for all betas.

In particular, we show that even if one accepts all of Dr. Vander Weide's claims as correct, simply correcting for his assumption of zero debt betas results in a cost of capital of 12.6 percent at a hypothetical 50/50 capital structure. Correcting for both the embedded cost of debt error and the use of zero debt betas results in a cost of capital of 13.3 percent. Using unadjusted betas, the corrected embedded cost of debt and positive debt betas results in an overall cost of capital of 13.9 percent, more than two full percentage points higher than the 11.83 percent.

We have calculated the overall cost of capital using Dr. Vander Weide's recommended procedures under alternative assumptions about the three inputs discussed above. The procedure to calculate the overall cost of capital is as follows: (1) calculate the beta at the 50/50 capital structure from the betas obtained at the observed capital structure, (2) calculate the CAPM or ECAPM cost of equity (r_E) from this new beta assuming that the risk-free rate is 7.27 percent and the corresponding market risk premium is 7.2 percent, (3) assume the cost of debt (r_D) is the embedded cost of debt, (4) calculate the weighted average cost of capital (r) at a 50/50 capital structure as $r = r_E \times .5 + r_D \times .5$. We report only the ECAPM since that is how the 11.83 percent was obtained, and is also the model Brattle relied on more heavily in its July 1994 Report.

We considered four alternative values for the embedded cost of debt: (a) the weighted average value used by Dr. Vander Weide of 8.31 percent; (b) the simple average of the embedded costs of debt of the companies used by Dr. Vander Weide in his affidavit 9.2 percent; (c) the simple average of those same companies excluding the Jones Intercable Limited Partnership, 9.7 percent; and (d) the 8.5 percent cost of debt recommended by the Commission in the Cost of Service Order. We considered two alternative scenarios for the debt betas. One scenario assumes the debt betas are zero per Dr. Vander Weide, the other assumes the debt betas are positive as in the Brattle study.[48] The overall cost of capital was

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[48] Brattle assumes a debt beta of 0.45 to unlever the equity beta at its observed capital structure. A debt beta of 0.25 is assumed to relever the equity beta to a 50/50 capital structure. We assume a lower debt beta at the 50/50 capital structure because with less debt the likelihood of defaulting on the debt is lower.

calculated assuming the average equity beta for the sample of cable companies at the observed capital structure is the adjusted beta of 1.54. Another scenario assumes the average equity beta is the unadjusted beta of 1.82.

Table 6 presents the results of these calculations. Almost half of the overall cost of capital estimates in this table exceed the 13.0 percent recommended by Brattle.

	Adjusted Beta		Unadjusted Beta	
Embedded Cost of Debt	*Zero Debt Betas*	*Positive Debt Betas*	*Zero Debt Betas*	*Positive Debt Betas*
8.31	11.8	12.6	12.4	13.2
8.5	11.9	12.7	12.5	13.3
9.2	12.3	13.1	12.8	13.6
9.7	12.5	13.3	13.1	13.9

TABLE 6
OVERALL COST OF CAPITAL ESTIMATES
PER DR. VANDER WEIDE RECOMMENDED METHODOLOGY
CORRECTING FOR DR. VANDER WEIDE INPUT ERRORS
(%)

We provide what we believe to be uncontestable evidence in this paper that debt betas are positive. Therefore, at the very least, even if one believes everything else Dr. Vander Weide has said, the overall cost of capital is 12.6 percent. On this assumption, the overall cost of capital using the cost of debt recommended by the Commission is slightly higher at 12.7 percent.

We have also shown that Dr. Vander Weide's 8.31 percent estimate of the embedded cost of debt is not an accurate representation of the *average* embedded cost of debt of the companies in the sample. The overall cost of capital at the *average* embedded cost of debt (9.2 percent) is 13.1 percent. The overall cost of capital at the average embedded cost of debt (9.7 percent) excluding the outlier, Jones Intercable Limited Partnership, is 13.3

percent. These latter two estimates are not considerably different from the 13.0 percent estimate recommended by Brattle.

We have also demonstrated that adjusting the equity beta to 1.0 is not appropriate in this case. The unadjusted betas obtained by Brattle are reasonable estimates of the prospective betas for the cable industry. The estimates in the last column of Table 6 indicate that under these assumptions, Dr. Vander Weide's recommended methodology yields overall cost of capital estimates of 13.2 percent to 13.9 percent. These estimates actually lend further support to the claim that Brattle's recommended estimate of 13.0 percent is a conservative estimate.

IV.   CONCLUSION

Dr. Vander Weide's criticisms of Brattle's analysis of the cable company cost of capital are without merit. We have presented here a detailed explanation of the scope and impact of his errors. That explanation shows that our recommendation of 13.0 percent as the industry's overall cost of capital is reasonable and conservative.